

729.3

(1903)







PATENTED  
HORIZONTAL

C  
CROSS  
S

FOLDING  
DOORS







CROSS PATENTED  
HORIZONTAL  
FOLDING DOOR



Variety Manufacturing Company

77-83 West Lake Street, Chicago, Ill.

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New York, 277 Broadway, George N. Cole, Agent  
Minneapolis, Minn., Variety Manufacturing Co.  
St. Louis, Mo., St. Louis Fire Door Co.







## Introductory



THE original patents covering the principles embodied in the present specifications of the CROSS Patented Horizontal Folding Door for freight-houses, mercantile establishments, etc., were taken out on December 4, 1900. Even before the date of final issuance of the patents, several railroads had put them on large freight-houses as one of the improvements necessary for the economic handling of their commodities. Its continuous use and repeated specification by the following railroad and transportation companies is, without any further remarks, a sufficient guarantee that the construction is all that we claim for it. (No door ever brought out has met with such immediate success.)

Chicago & Northwestern Ry., Cedar Rapids, Ia., and Rockford, Ill.

Chicago & Alton Ry., Springfield, Ill., and Joliet, Ill.

Chicago Terminal Transfer Co., Chicago.

Chicago, Burlington & Quincy Ry., Chicago.

Chicago, Milwaukee & St. Paul Ry., Minneapolis and Chicago.

Lake Shore & Michigan Southern Ry., Chicago.

Chicago, Rock Island & Pacific Ry., Chicago.

Chicago & Great Western Ry., Chicago.

Delaware, Lackawanna & Western Ry., Used as standard.

Pennsylvania Ry., Chicago to New York City.

Lehigh Valley Ry., Buffalo.

Long Island Ry., Long Island.

Erie Ry., Jamestown, N. Y.

White Star Line—Pier entrances, North River, New York.

New York Central Ry.

Illinois Central Ry.

Baltimore & Ohio Ry., Washington, D. C., and Chicago.

Central Ry. of New Jersey, Pier 43, North River, New York.

Metropolitan Express Co., New York City.

Adams Express Co., Newark, N. J.

Louisville & Nashville R. R., Louisville, Ky., and Gulfport, Miss.

American Express Co. Stables, Chicago.

U. S. Express Co., Newark and Hoboken, N. J.

1089-8452 TC



On March 10, 1903, the Franklin Institute of Philadelphia, where improvements in processes and devices in every line have been fostered, saw fit to award us the John Scott bronze medal and diploma for general all-around perfection of action and utility. See mention thereof on page 24.

The CROSS H. F. Door is the result of extended experiments, covering the question of "convenient doors" from all standpoints. Economy of space, cost, construction, and every phase of a door's existence from its inception, have been thoroughly studied and no "unknown quantity" is encountered. In its installation, the results are invariably entirely satisfactory and highly gratifying. It is suitable for almost anywhere; can be conveniently installed at the time of erection of buildings or later if desired, and is operated by hand or automatically. It may be of any size, material or weight. Our idea in designing such a door for general use was to produce as nearly as possible one that, while minimizing operating space, would combine simplicity, durability and rigidity of construction with ease and speed in handling. The wear on parts is practically *nil*, all friction being taken up in the hinges and rollers. It is most durable and fills a long-felt want for freight-houses and piers, warehouses, factory buildings, express and train depots and sheds, chemical laboratories, ice-houses and cold-storage plants, car barns, shipping floors of large wholesale and retail mercantile establishments, and the like—in fact, there is no branch of industry where the door has not been utilized to great advantage.

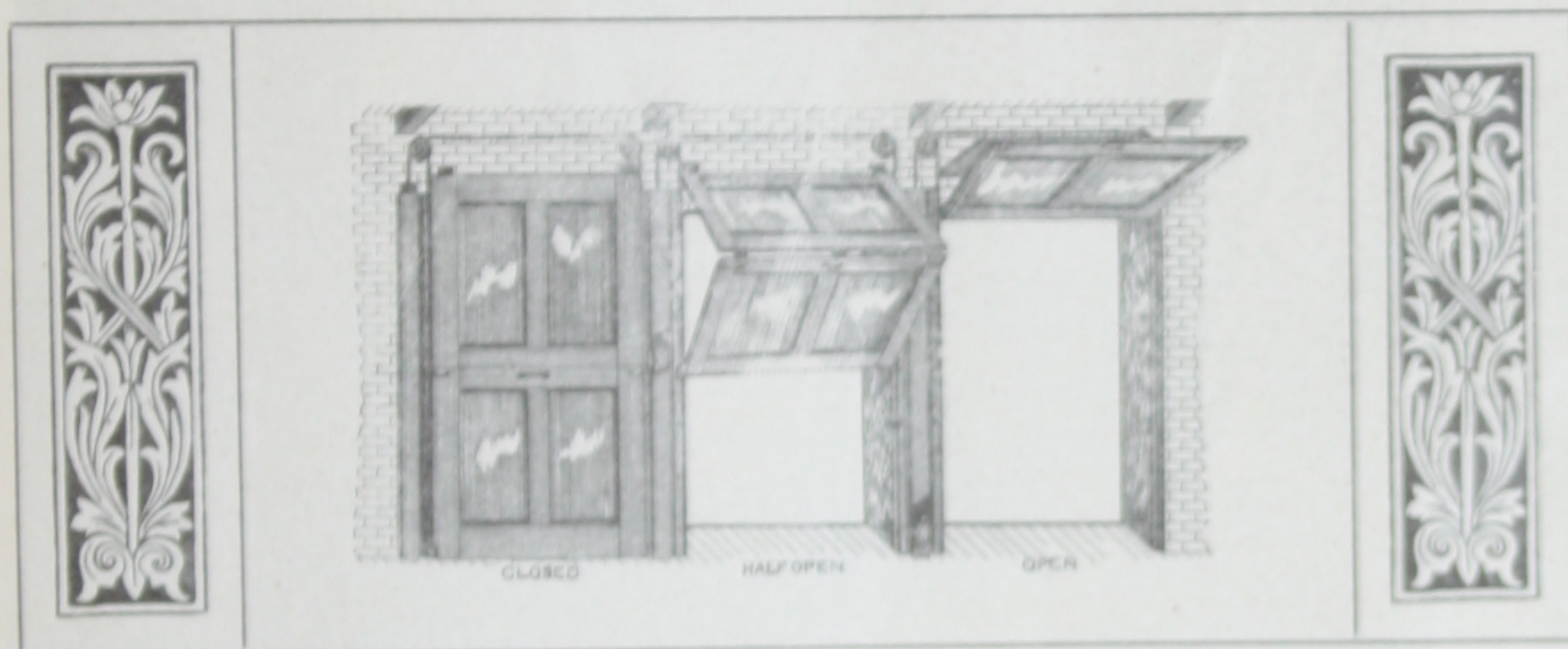
Ultimate economy in door-construction is obtained by the use of an *efficient door* that shall be *most durable*. Efficiency is entirely dependent upon ease of operation and handling, and the material and method of using it have most important relation to the life of the appliance; in fact, the construction is the foundation of the whole art.

A careful perusal of the descriptive matter herewith will convince the most skeptical that we offer in the CROSS H. F. Door the proper solution of the problems involved.





## CROSS Horizontal Folding Doors

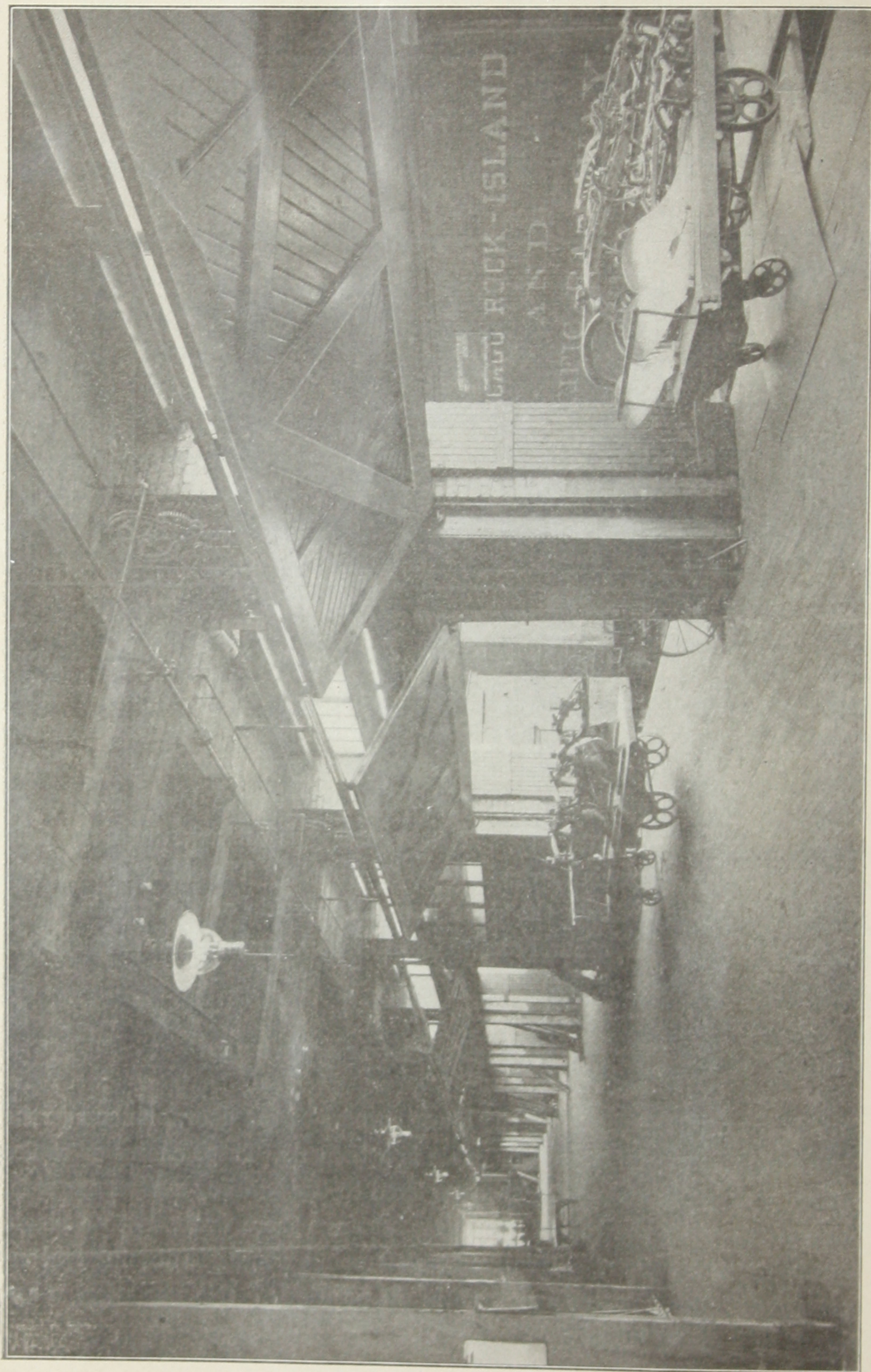


The door is hung *to the wall* at the top ends of the continuous and extension stiles (side frame-work of the door proper), by off-set or other substantial hinges. Half way down, between these supports and the floor-line, it is divided horizontally into two parts connected by strap-hinges of exceedingly strong design. At the extreme lower corners of the door, on the outside edges, a shoe-casting is affixed, upon the axle of which revolve specially devised roller wheels. The tracks for these wheels run up and down the door jams at the side of the opening, and are heavy angle iron, securely bolted to the wall, and make a deep rabbit, into which the door closes.

### Perfectly Counterbalanced

To each of the shoes, at the lower corners of the door, one end of the counterbalance weight-chain or cable is attached. These chains or cables run up over pulley wheels or sheaves fixed to the *building wall* at one side, about even with the top of the door, and are there fastened to a single counterbalance weight. This counterbalancing weight is absolutely constant, and holds the door positive in all positions. (No variation is apparent in a door weighing five tons.)



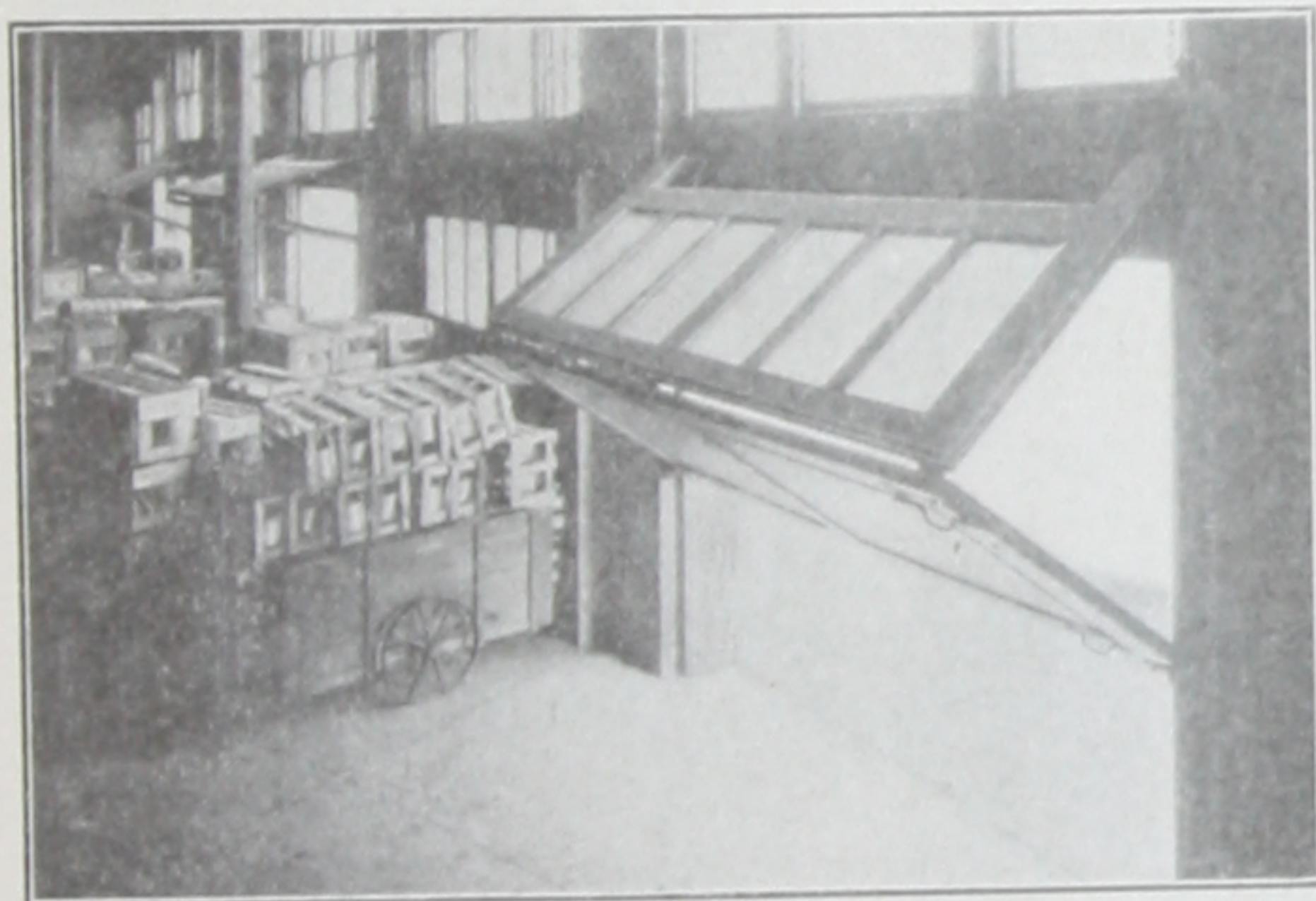


SHIPPING FLOOR—DEERE, WEBER CO., AGRICULTURAL IMPLEMENTS, MINN. TEN DOORS, 13 FEET WIDE BY 10 HIGH.  
WOOD WITH WIRE GLASS PANELS IN UPPER HALF.



## Facility for Operating

To open or close a door, pull gently on the handles up or down, as the case may be. When the wheels carrying the lower edge of the door are rolled up along the tracks, the center, where the two parts are hinged together, is forced out from the wall and upward until the full opening is attained, at which stage the outlines of the folded portion of the door have the form of an isosceles triangle, of which the base is formed by that part of the wall between the top hinges and the rollers at the lower corner. This gives the door the strength and rigidity of a triangle, the strongest construction known in mechanics. When the door is down, the wall is left clear and plain without any projections or obstructions, so that maximum storage space is available and the general appearance of the whole installation materially enhanced.



COMBINATION WOODEN AND GLASS DOOR IN  
LARGE MERCANTILE ESTABLISHMENT  
IN CHICAGO.



CHICAGO, ROCK ISLAND & PACIFIC FREIGHT  
HOUSE AND TRAIN SHED AT CHICAGO, 96  
DOORS INSTALLED.

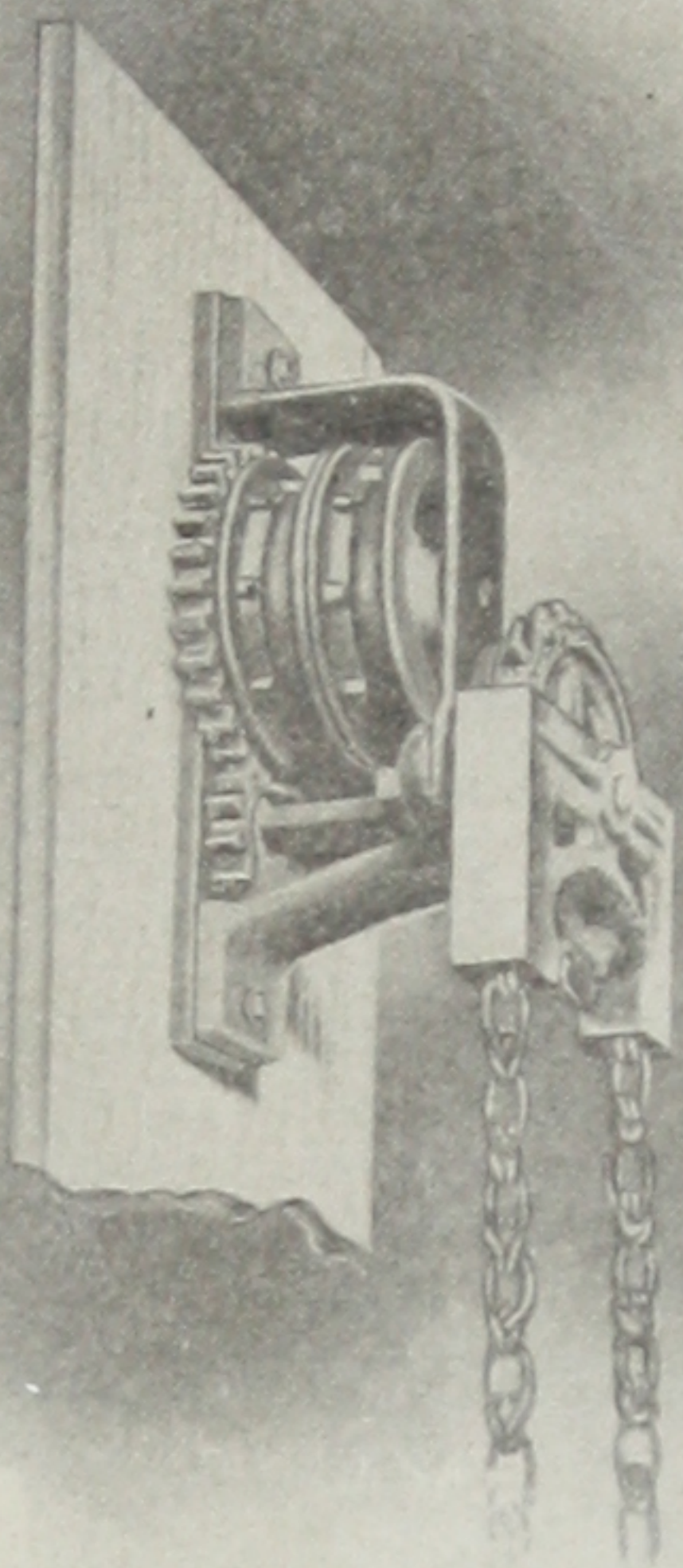
Attached to the side of the projecting face of the roller tracks, for perhaps three feet from the floor-line, is an "L"-shaped auxiliary track, which engages snugly fitting flange-plates affixed to the roller axle of the shoe.

## Positive Action

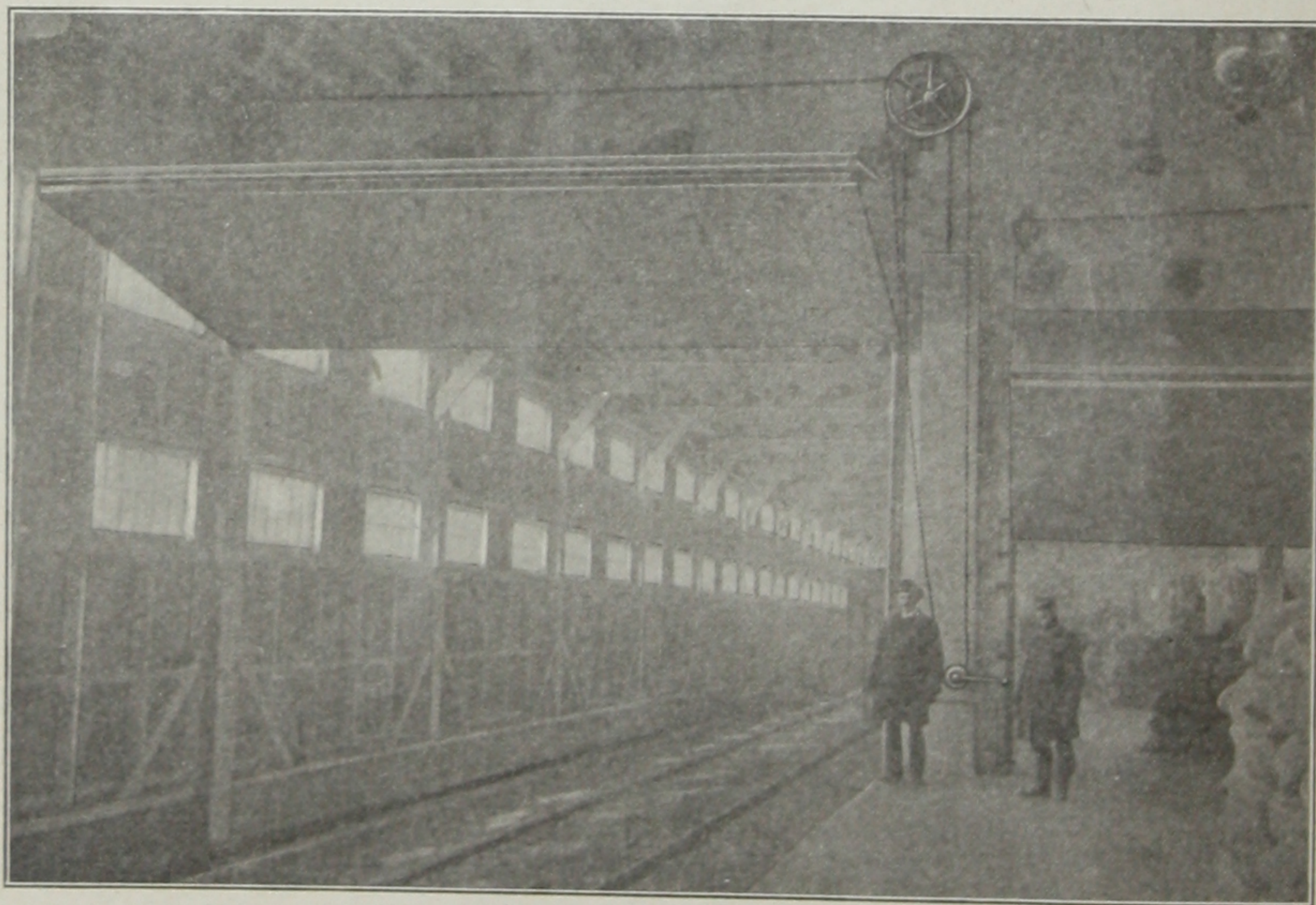
When the downward thrust, occasioned by the weight of the door forcing the rollers against the wall, is least, *i. e.*, when the door is nearly closed, this track serves to maintain the rollers firmly against the upright tracks and prevents the bottom edge of the door from swinging away from the wall.



## Heavy Doors with Hoists

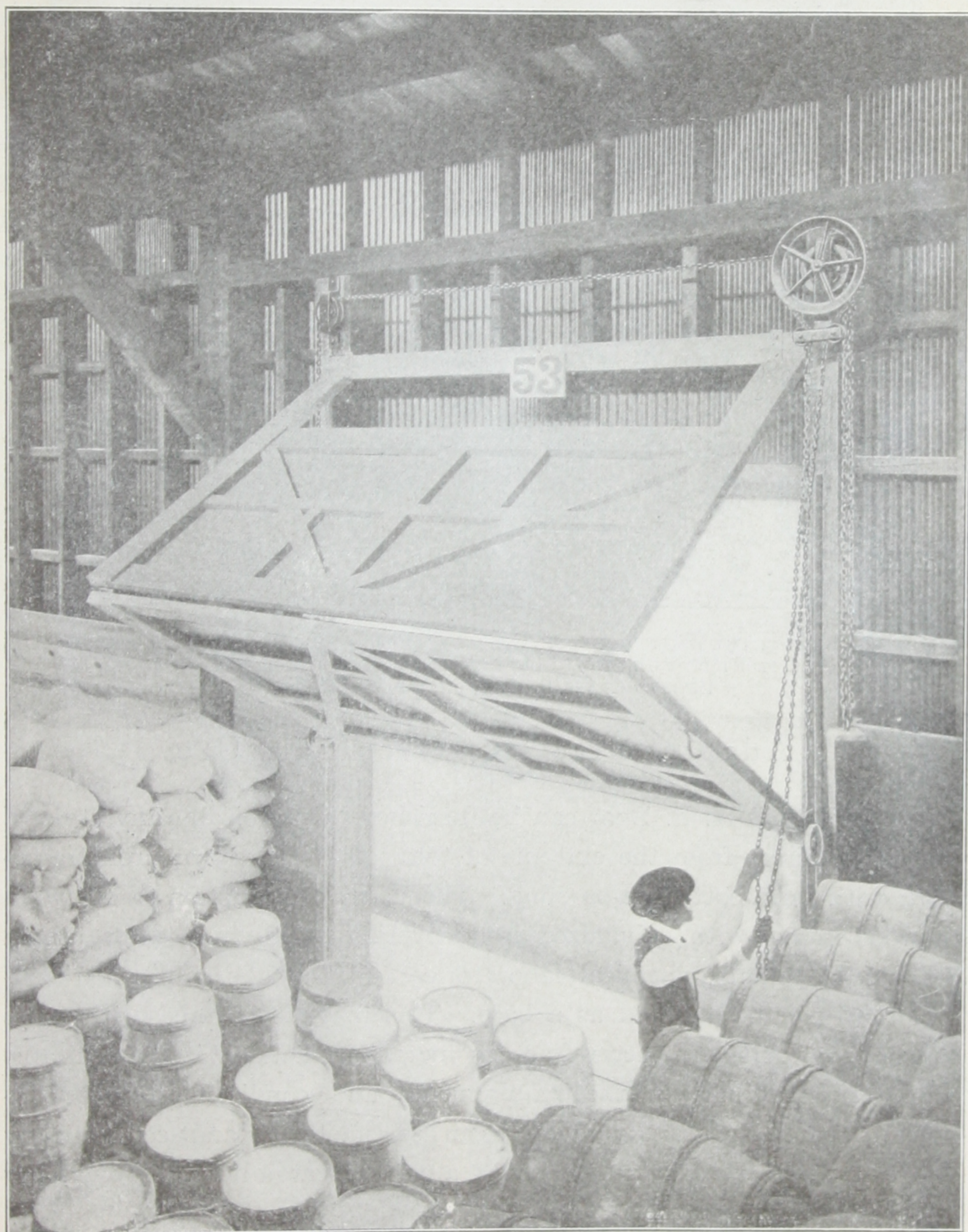


For doors of great height and weight, hoists made after the best crane design, augment the usual form of counterbalance. Upon the projecting end of an axle, as shown in illustration, a large sprocket wheel is securely affixed. Over this wheel, and between guides on each side, an endless chain passes, extending down alongside of the door and within easy reach. When this chain is pulled down in one direction, it turns the large wheel, which, through the transmission of motion to the axle and pulley-wheel, results in the descent of the weight and the consequent raising of the door upward to a folded position. To close the door the chain is pulled in the opposite direction.



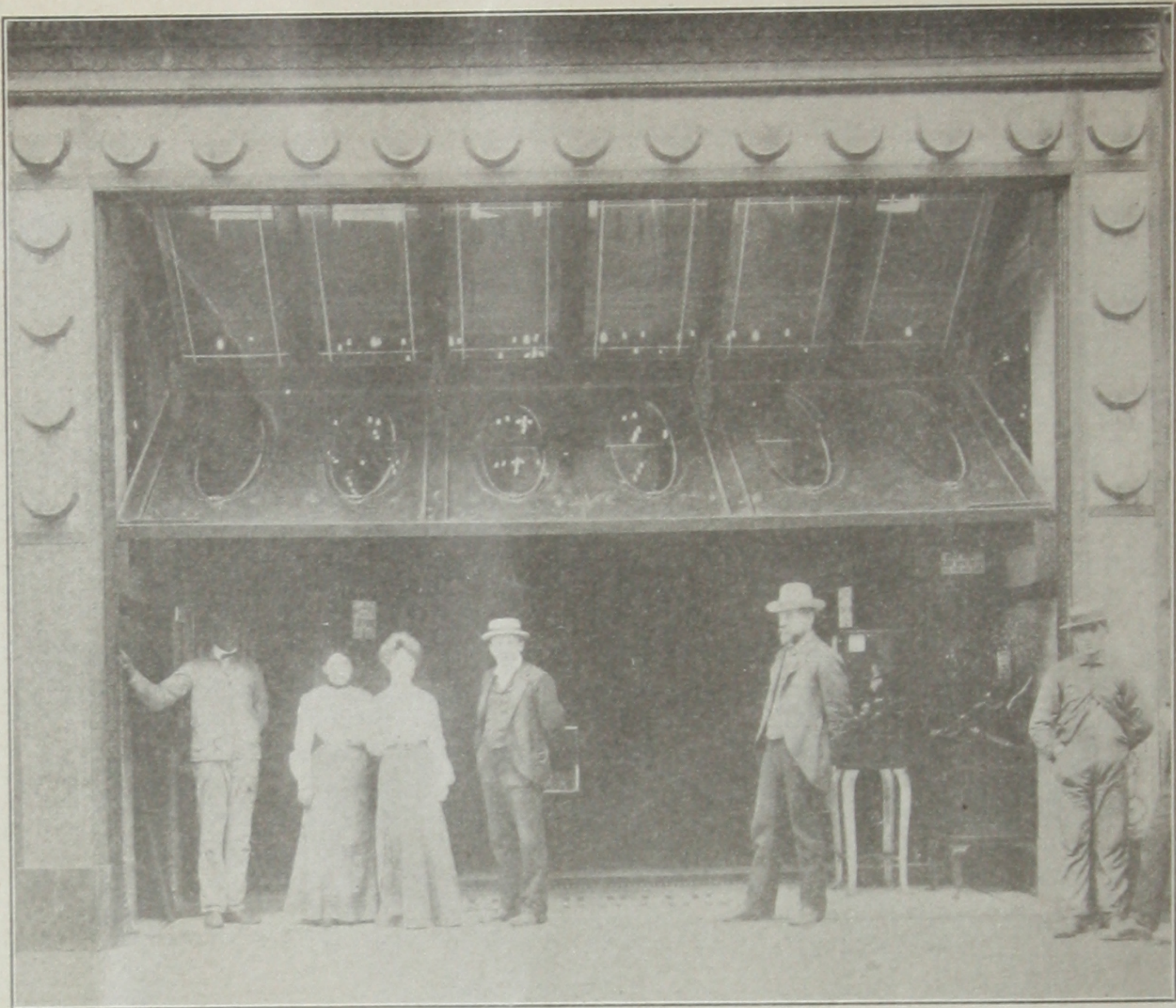
LEHIGH VALLEY R. R. FREIGHT HOUSE, BUFFALO, N. Y. (SHOWING TWO OF AN EIGHTY-TWO DOOR INSTALLATION). LARGE DOOR 20 FEET WIDE, 19 HIGH, WEIGHING 9,000 LBS. SMALL DOOR 12 FEET SQUARE.





CROSS "Hoist" Door AS USED ON D., L. & W. R. R. FREIGHT PIER 5, HOBOKEN, N. J.





STATE STREET AMUSEMENT PARLOR, CHICAGO, SHOWING A CROSS DOOR OPENING  
ENTIRE FRONT OF BUILDING. CONSTRUCTED OF IRON, WITH LARGE FANCY  
BEVELED GLASS PANELS, ONLY PARTLY RAISED.

## Adaptability for General Use

The CROSS H. F. Door can be furnished in practically any style of material desired, from the extreme of total glass sash to an iron framework with terra-cotta fire-proofing. The usual construction is all wood or wood-frame, with galvanized iron covering or all iron. For use in cold-storage plants, chemical laboratories and the like, full wood construction may be adopted as a base. This may be covered with sheet copper, zinc or such other refractory metal, or metal plates of suitable composition. Whatever the requirements and conditions to be considered from this standpoint, we can satisfactorily and economically solve the problem at issue. This is a very great advantage over any other door on the market.

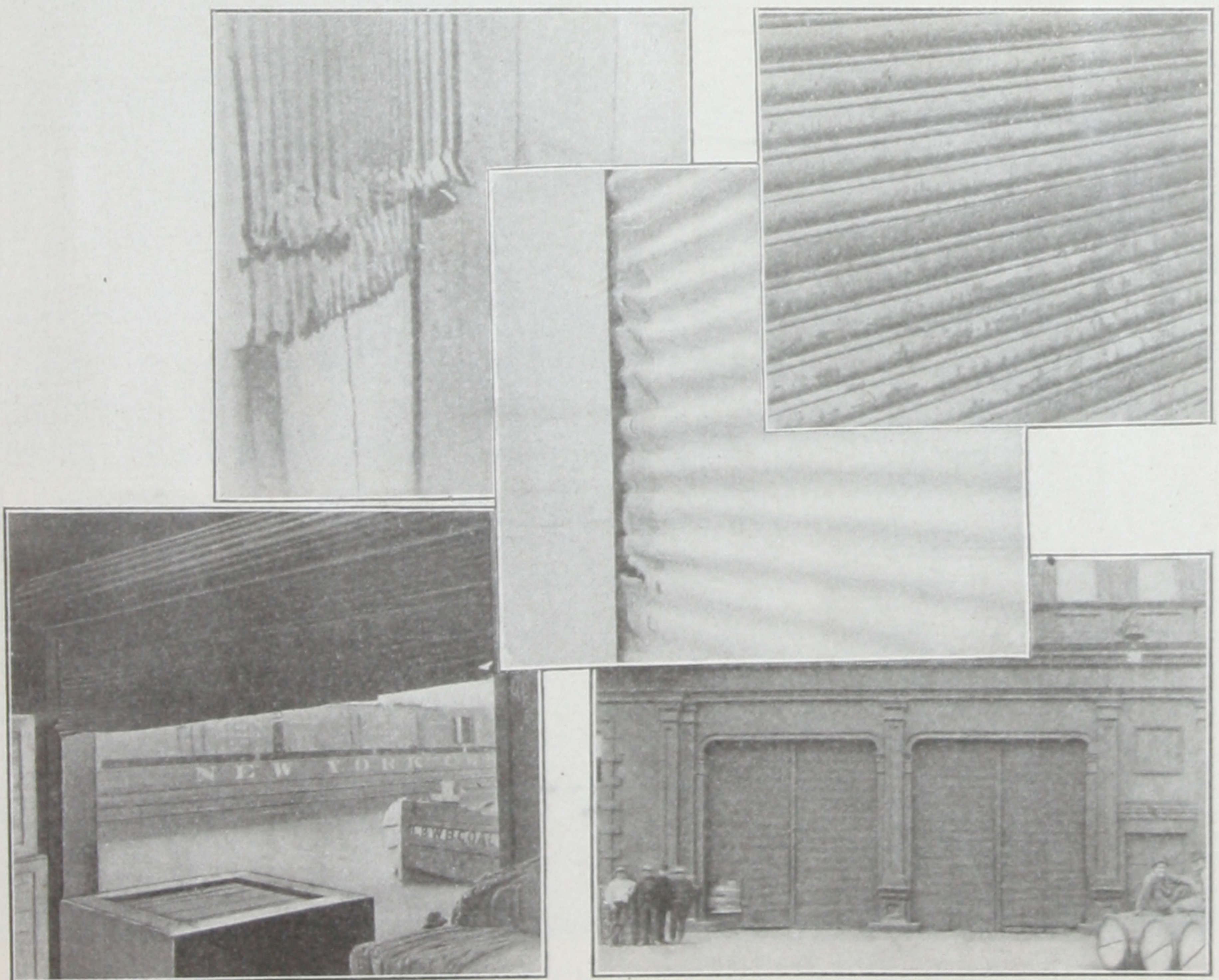
The life of the rolling *steel* or "coiling" shutter depends upon the integrity of its curtain, which is built up of many connected slats or sheets. If one of these units, or any part of the curtain becomes disarranged or



damaged, the whole shutter is permanently affected. The injury spreads and the door is soon useless. The *sheet metal* covering of a CROSS Horizontal Folding Door may be damaged or disappear entirely and the frame will still be perfect in operation and ready at any convenient time to have a new covering attached. The constant friction on a door "coiling" up and down, one part scraping against the others and the shaking against the guides as a result of the winds blowing the closed door back and forth, is a source of unavoidable abrasion and rust, which destroy them. *One part of the CROSS H. F. Door never touches another*, and the covering is therefore not subject to such injury.

### Comparative Utility and Stability

There is an inherent physical disability in the unsupported edges of a rolling door, which is augmented greatly by the small plates attached thereto for the purpose of taking up the frictional wear. This stiffening



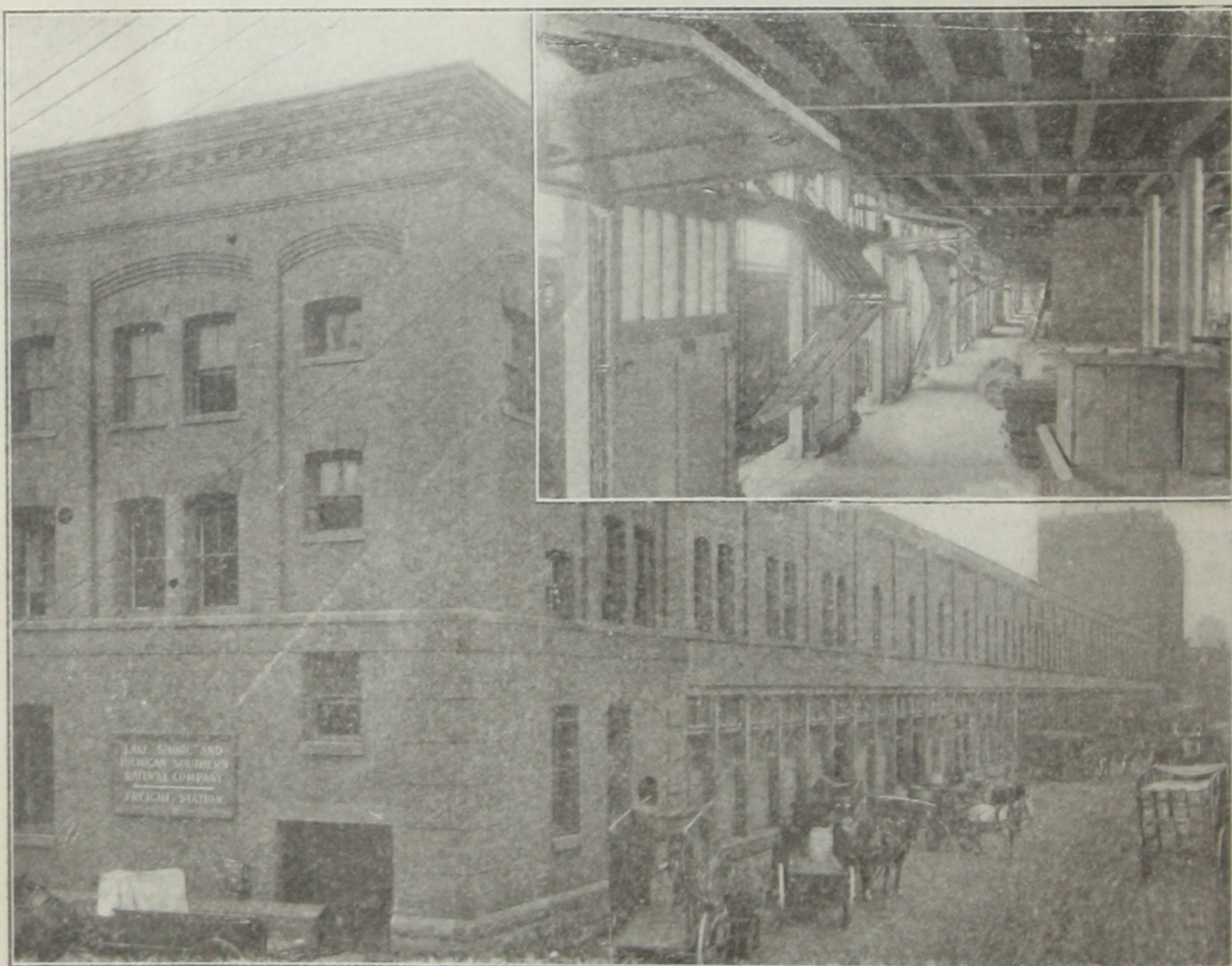
SOME INTERESTING SPECIMENS OF SHUTTERS AND DOORS. NOT "CROSS."



of parts only of the edges concentrates the strain in bending, causes early rips and splits and actually defeats the primary object of these parts. On the CROSS Horizontal Folding Door there is no strain of that character.

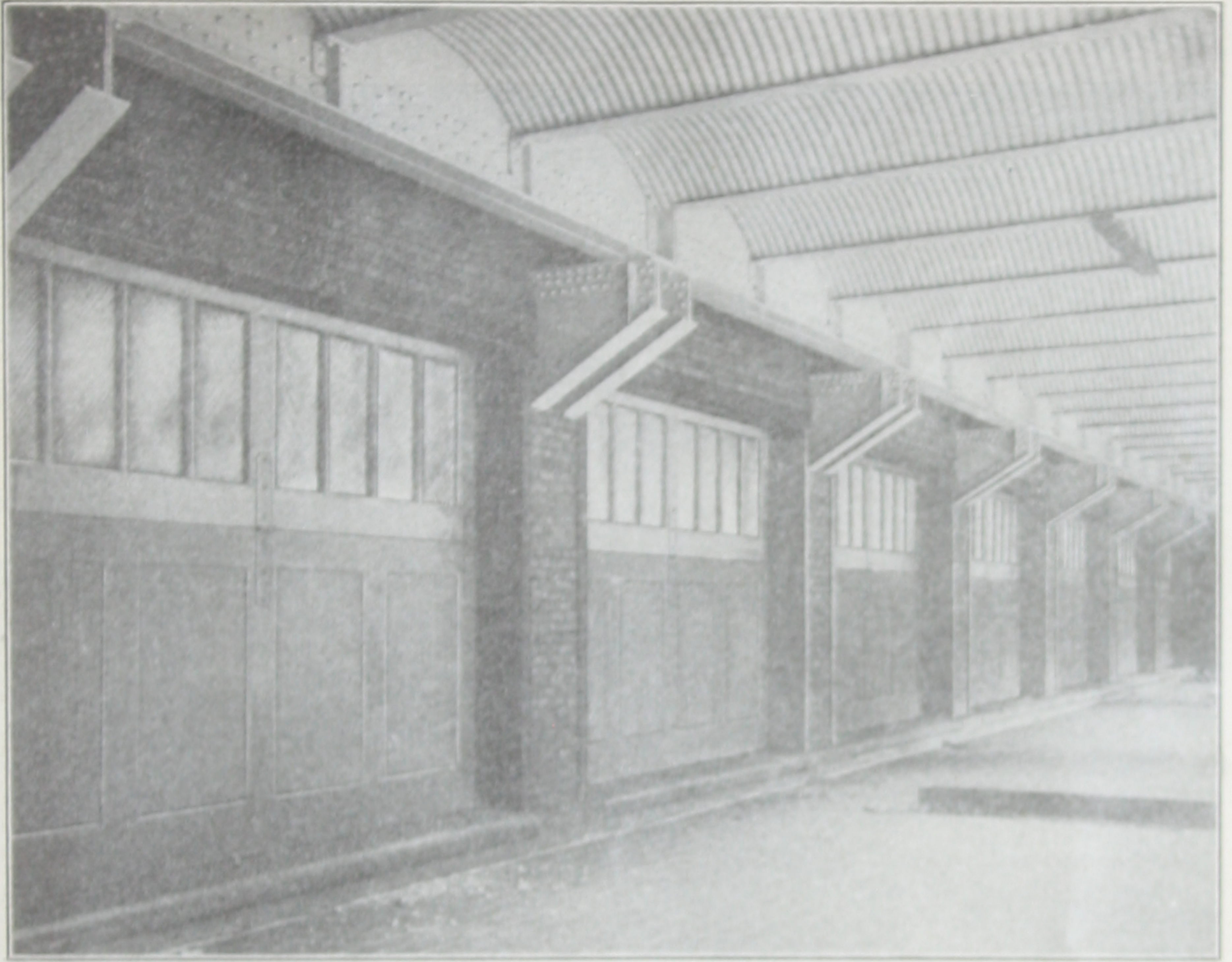
If it is decided that, after one of our doors is installed, it is too small, too large, or not placed in most desirable position, the same fixtures may be used on a new door of the proper size and operate as satisfactorily as on the door originally intended for.

The CROSS H. F. Door will give a maximum of service under the most adverse circumstances. Its ease of action increases with its age, saving engineer and architect worry as to subsequent service. When they are opened, they are at the top of the opening *out of the way*, and cannot be damaged or disabled. When closed down they leave *no supporting scaffold or brackets* behind to take up room. The walls are entirely free and clear of any obstruction.



LAKE SHORE & MICHIGAN SOUTHERN—CHICAGO TERMINAL FREIGHT STATION, 129 DOORS OF WOOD AND WIRE GLASS INSTALLED WITH ONLY 8 INCHES BETWEEN OPENINGS.





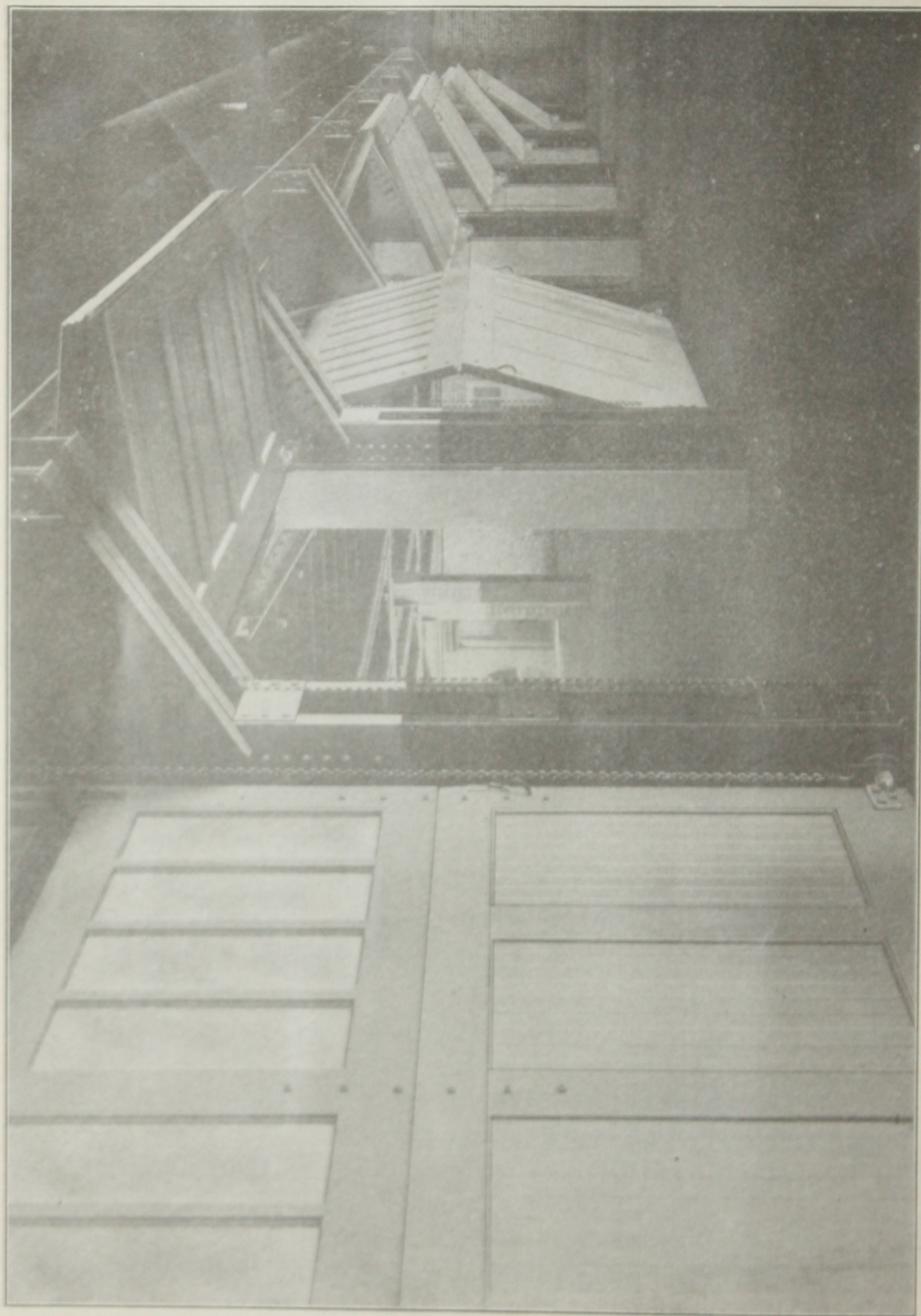
BAGGAGE AND EXPRESS ROOMS, NEW LAKE SHORE & ROCK ISLAND R. R. COMPANIES' STATION,  
VIEWING CLOSED DOORS FROM OUTSIDE.

### Comparative Convenience

When a solid door is made to slide up perpendicularly, additional height of wall must be provided above the door opening, frequently a very expensive provision, especially so when the building equipped is but one story in height. Under such circumstances an addition of some eight or ten feet, according to the height of the opening proper, must be arranged for. Even in buildings of greater height the expense of fitting for a vertical slide door is excessive, as special fixtures and work is required, and then the door would probably open up directly in the way of light and ventilation of the floors above.

With the CROSS H. F. Doors these disagreeable features are eliminated. Very little head-room is required, this one item alone saving, probably, 30% of the cost of construction for the builder. Further, and this is a distinct advantage, no foot-room is required in order to reach the locks, these devices being placed about half way up on each side of our door within easy reach over the piles of merchandise and stores.





BAGGAGE AND EXPRESS ROOMS, NEW LAKE SHORE & ROCK ISLAND RAILROAD'S STATION, CHICAGO, 44 DOORS INSTALLED. PAGE 13 SHOWS  
SAME INSTALLATION FROM OUTSIDE.



In warehouses, etc., a special swing bolt is used, and proves entirely satisfactory.

The whole side of a freight-house or depot may be built of continuous C. H. F. Doors with simply an eight-inch post between the openings, practically throwing the whole face of the building open. This makes the *whole interior*, or any part of a building, *accessible at any point*. Cars need not be rolled up to any particular point in order to load or unload; wherever they are stopped, the convenient door may be opened, or all doors opened and work commenced immediately. At the same time, when the doors are closed, they will withstand as much pressure



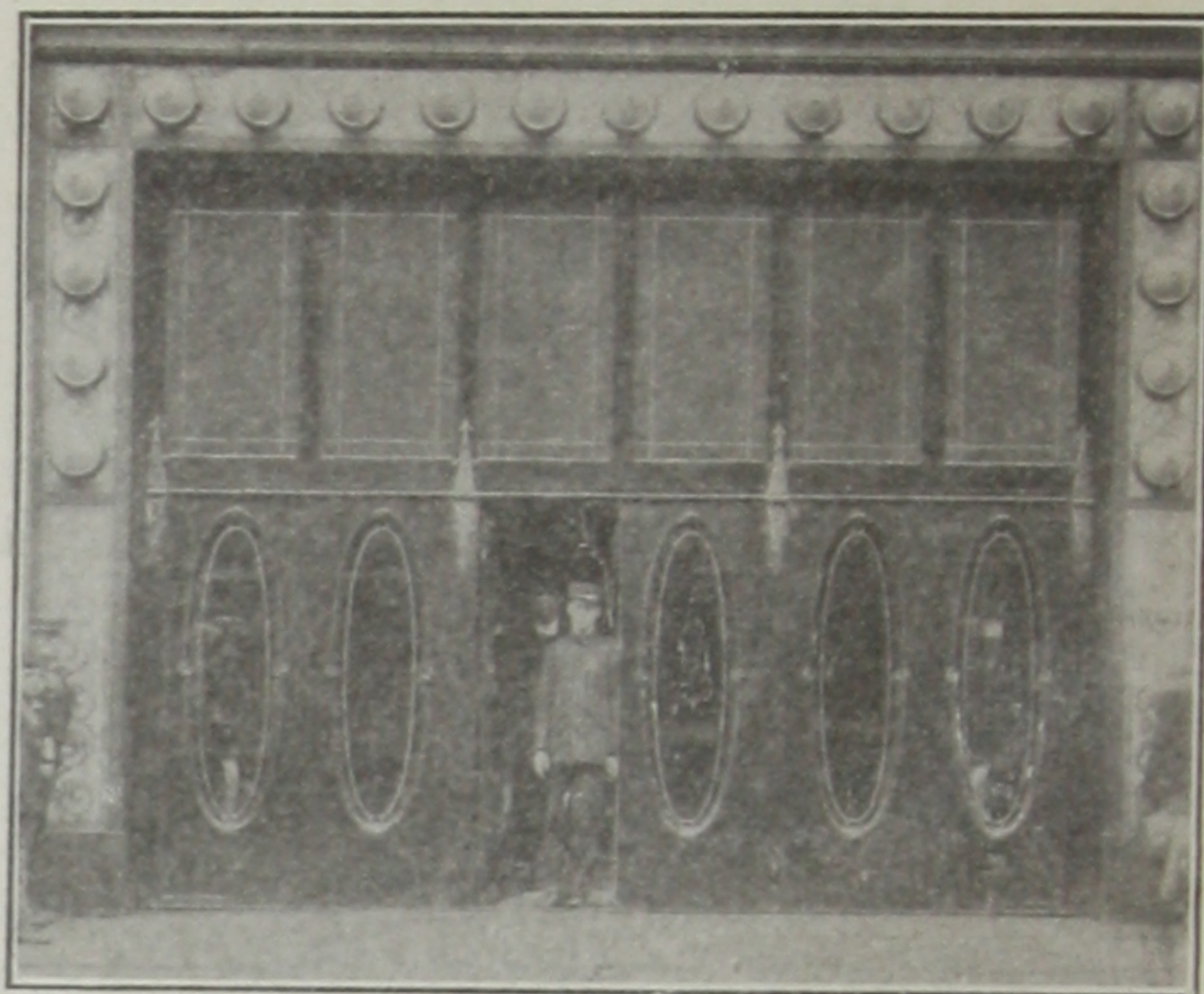
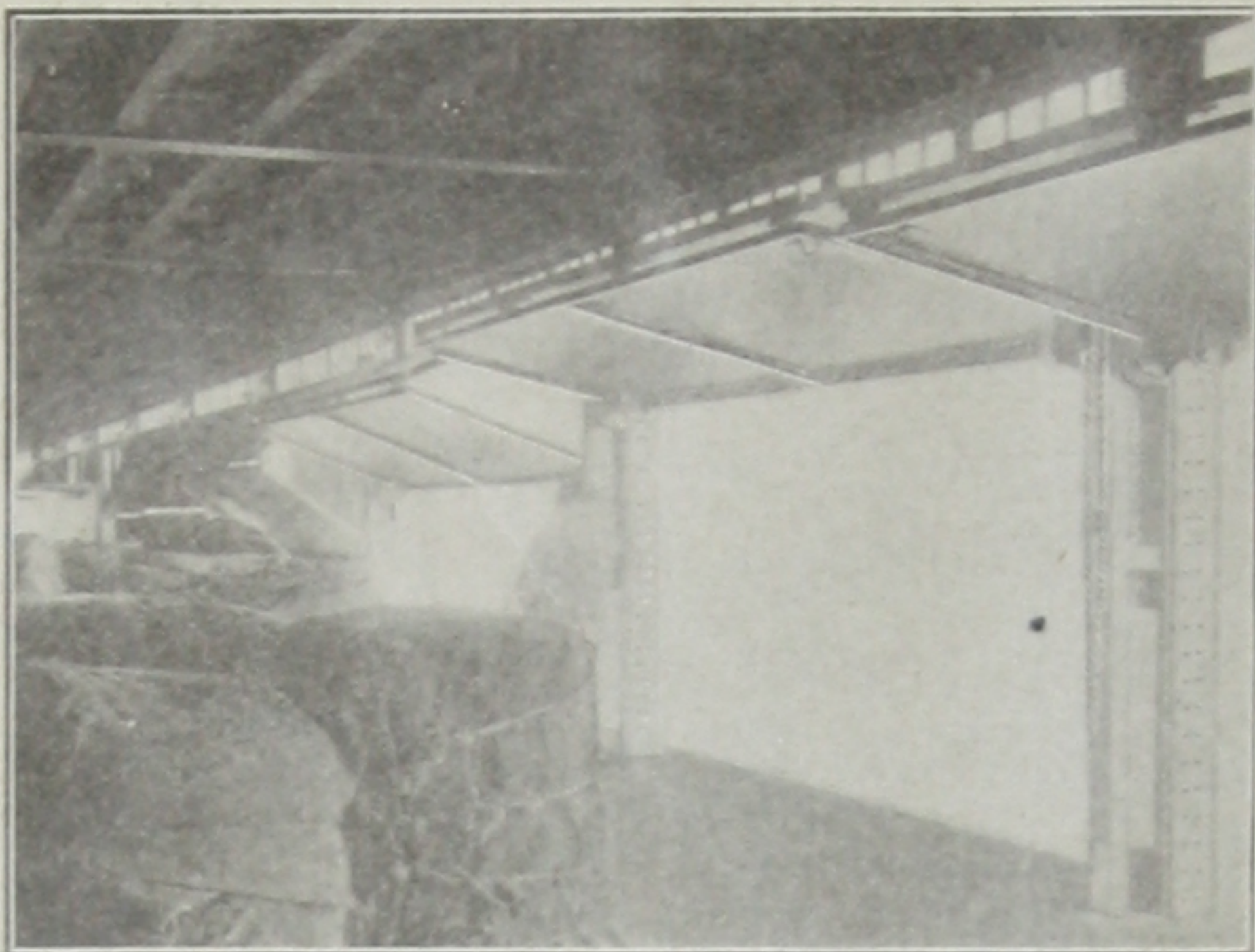
CHICAGO, MILWAUKEE & ST. PAUL FREIGHT STATION, AFTER CROSS DOORS HAD BEEN INSTALLED TO TAKE PLACE OF SLIDING. THE WHOLE FRONT AVAILABLE FOR TEAMING.

as the wall of the building itself. The solution of this problem has been the life-thought of many of our great architects and engineers.

### Convenience for Shipping Floors

On the team side of a freight building, shipping depot or floor, there are three essential points to consider in making the space most available for wagons and trucks—first, a maximum number of spaces for wagons; second, floor space sufficient for handling the freight received or to be shipped and, third, height of door sufficient for loading or unloading wagons. To make the first and last maxima and maintain the second at a minimum, engineers are now doing away entirely with the outside platform by setting the walls to its outside edge and putting in every panel a Horizontal Folding Door about ten feet in height. This has the advantage of doing away with what was formerly inside passage-room and





CHICAGO TERMINAL TRANSFER STATION, 14  
DOORS OF NO. 12 SHEET IRON, ANGLE  
IRON FRAME, 17 FEET WIDE.

SAME DOOR AS SHOWN ON PAGE 10, CLOSED,  
WITH ONE "WICKET" OPEN.

bringing the outside run-away inside to take its place, giving for additional storage-room the difference between the former construction and the style made possible by the installation of CROSS Horizontal Folding Doors. It will be easily seen that this latter plan actually adds two or three feet to the width of the houses, which would otherwise go to waste in outside platform. Such an increase in floor space is a considerable item.

The edge of the CROSS H. F. Door closes into as deep a rabbit as the ordinary door and this, combined with its being made of wood for warmth, makes it much more desirable for stores, factories and depots than the single thickness of steel, which is a powerful radiator.

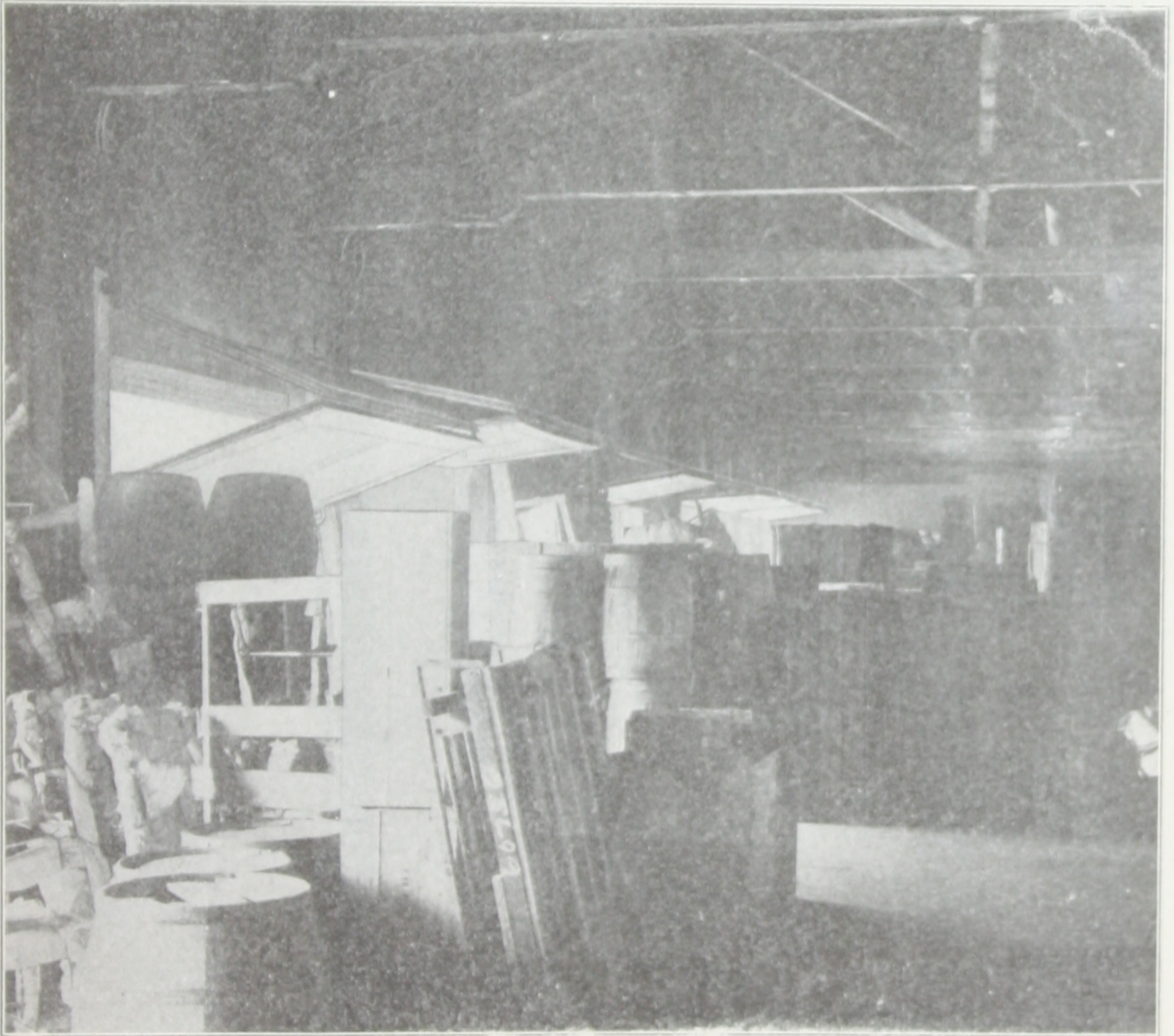


PENNSYLVANIA R. R. HALSTED ST. FREIGHT HOUSE, CHICAGO, 44 CROSS DOORS REPLACED  
SIDE SLIDING DOORS.



Another point of merit, aside from those quoted above, in case of necessary repairs the job can be accomplished easily by any ordinary mechanic, with ordinary tools, with ordinary materials. No experts are required.

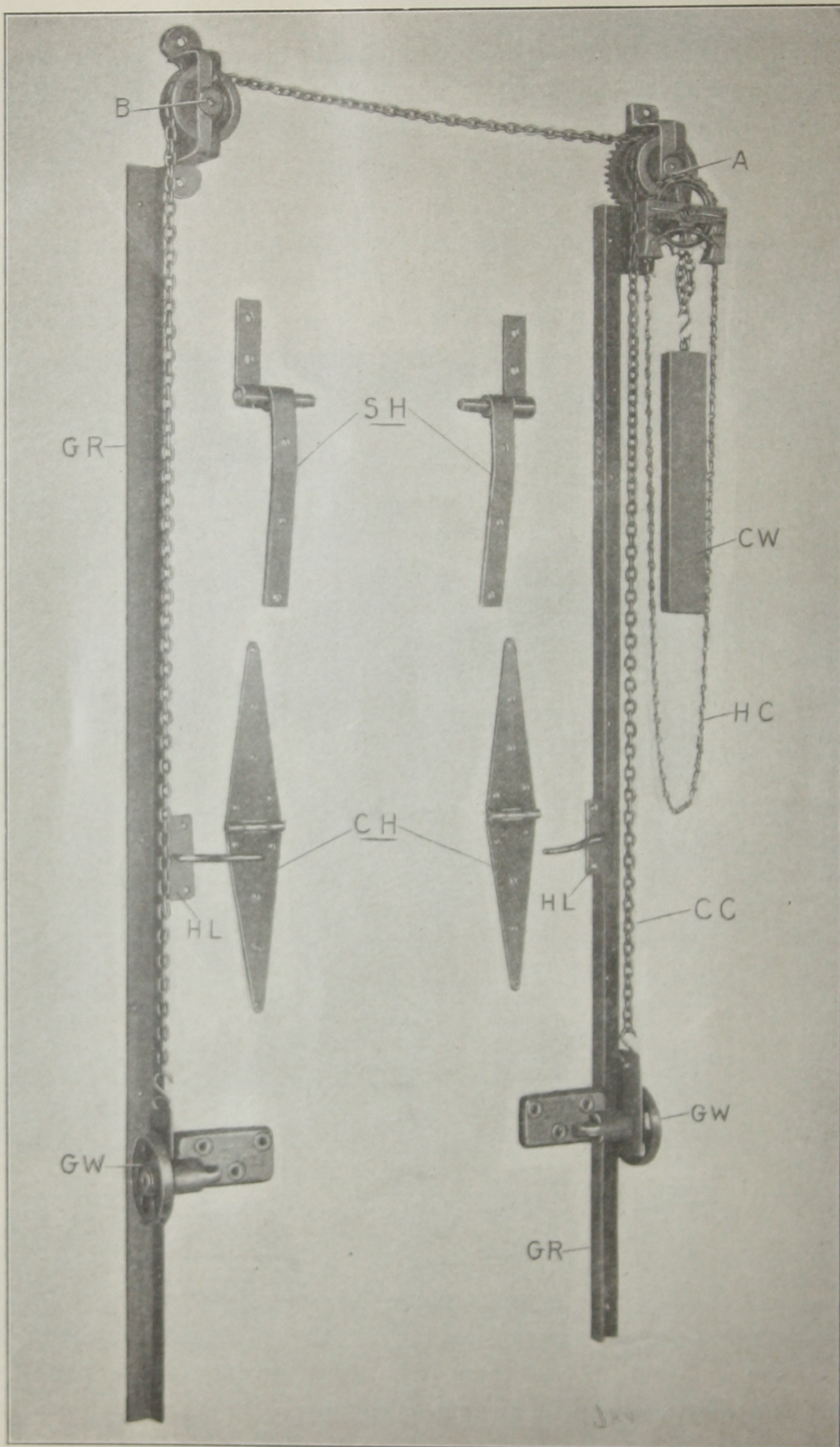
For houses and piers, where an extended or projecting, covered or uncovered platform exists on the outside of the building, for loading and



INTERIOR PENNSYLVANIA R. R. FREIGHT STATION, CHICAGO, ILL.

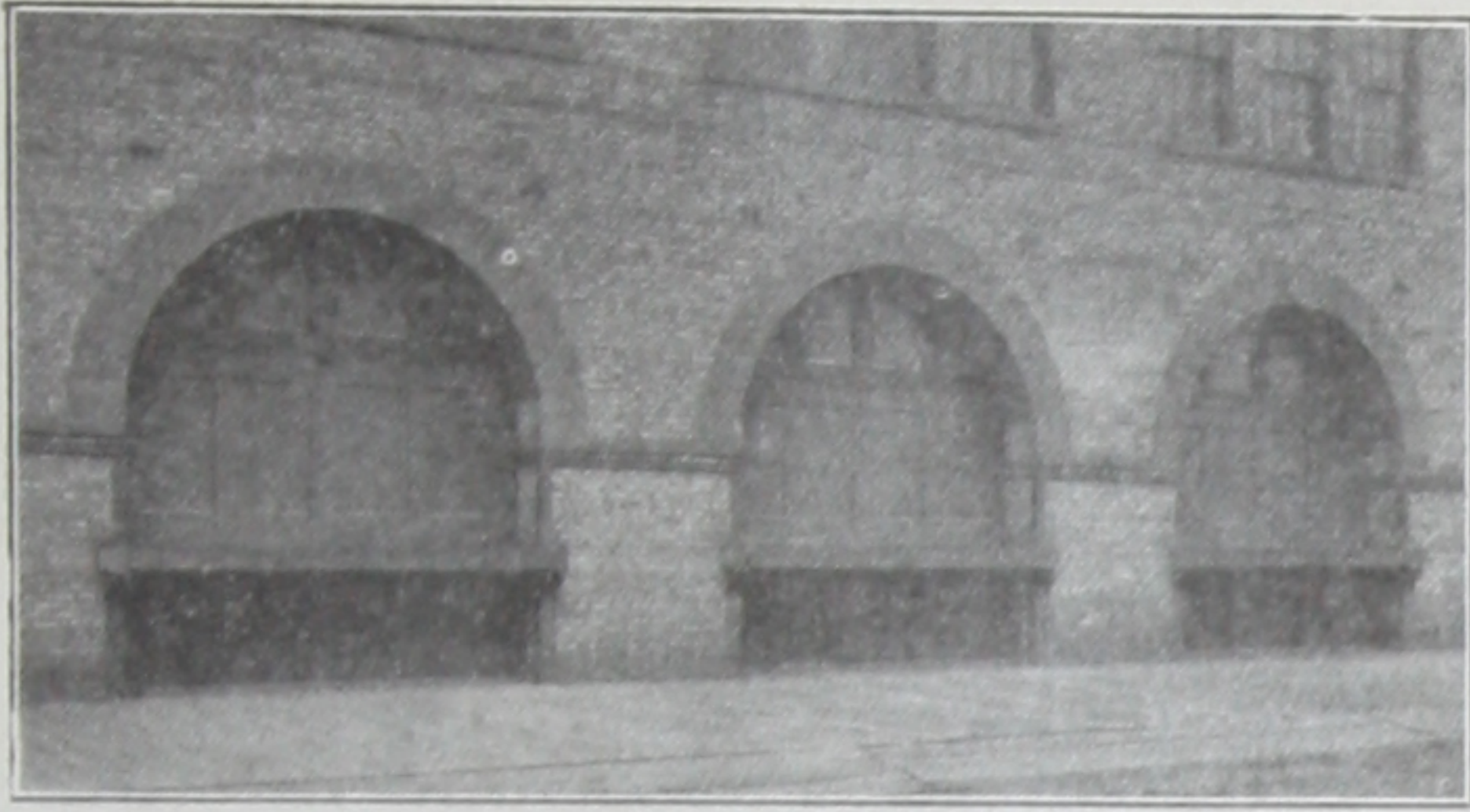
unloading to and from cars and trucks, this door is *par excellence*. It is made to swing outward, saving for the user the space given in the thickness of the wall and, in case there is no other covering to the platform, serves as a most convenient awning or canopy.



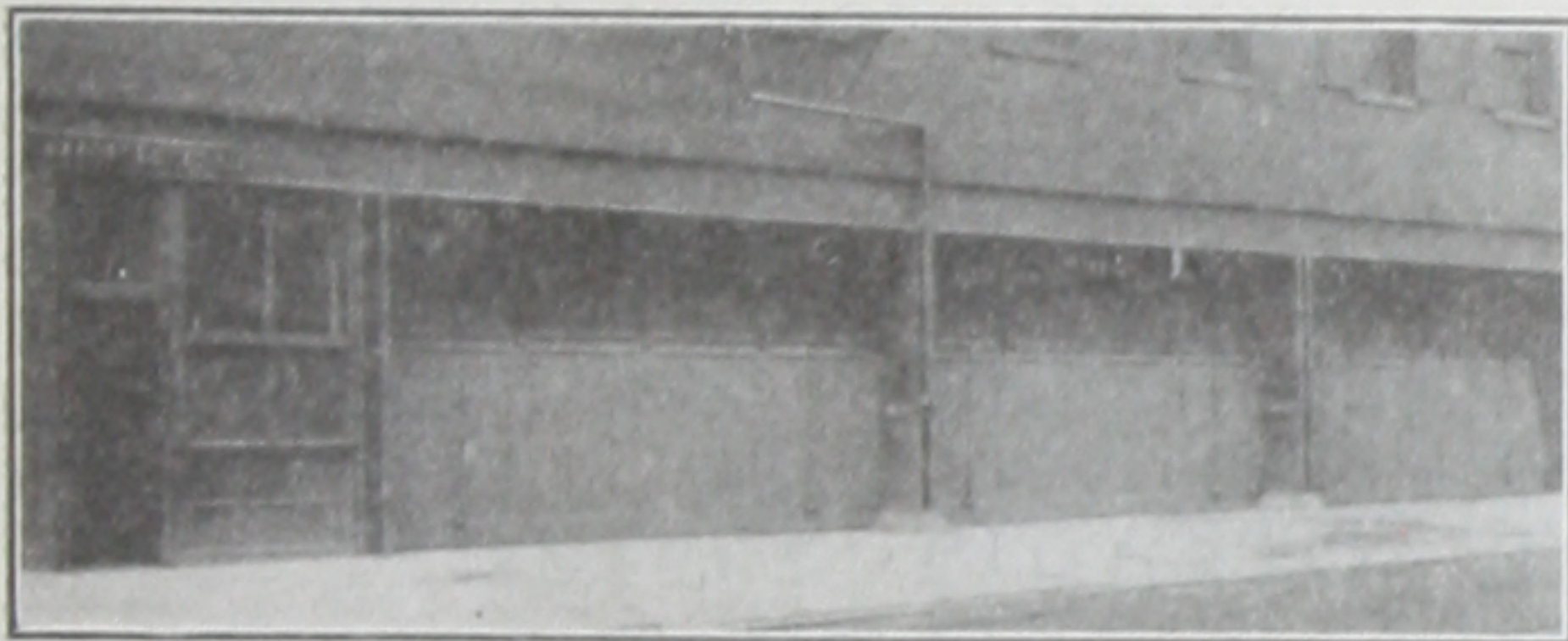


See opposite page.





SCULLY STEEL & IRON CO., CHICAGO. UPPER  
HALF OF WIRE GLASS DOORS MEASURE 12  
FEET WIDE, 8 FEET HIGH.



22-FOOT DOOR INSTALLED FOR MESSRS.  
J. T. RYERSON & SON, CHICAGO.

# The CROSS

## Horizontal

## Folding Door

Is universally approved  
and specified by architects  
and builders throughout  
Chicago in every case  
where prevailing con-  
ditions permit or where  
modifications justify the  
installation :: :: :: ::

### EXPLANATION OF PLATE OF PARTS ON PAGE 18

**GW** Guide Wheels and Shoes affixed to lower corners of lower half of door. When door is opened and closed these wheels run up and down tracks and facilitate operation of door.

**GR** the two Guide Rails or Tracks fitted onto door jam, upon which guide wheels run up and down when door is opened or closed.

**A** is Patent Hoist Apparatus, which materially assists counterweight device in holding door constant, and facilitates ease of operation.

**B** Single Wheel usually furnished for chain to off-side wheel and shoe. Where this wheel cannot be used we furnish one supported from top only.

**CW** Counterweight of about 60% of entire weight of door proper.

**HC** Hand Chain placed within reach of operator by means of which door is opened and closed.

**CC** Counterweight Chain, the other ends of which are attached to the counterweight—this arrangement holds the door constant in all positions, and makes possible their easy operation.

**SH** Supporting Hinges which hold top of door to wall. Note the size and consequent strength of same.

**CH** Center Hinges which join the two sections of the door, and allow lower section thereof to lap in under top half when door is opened.

**HL** Hand Locks or Bolts furnished on all doors unless otherwise specified.





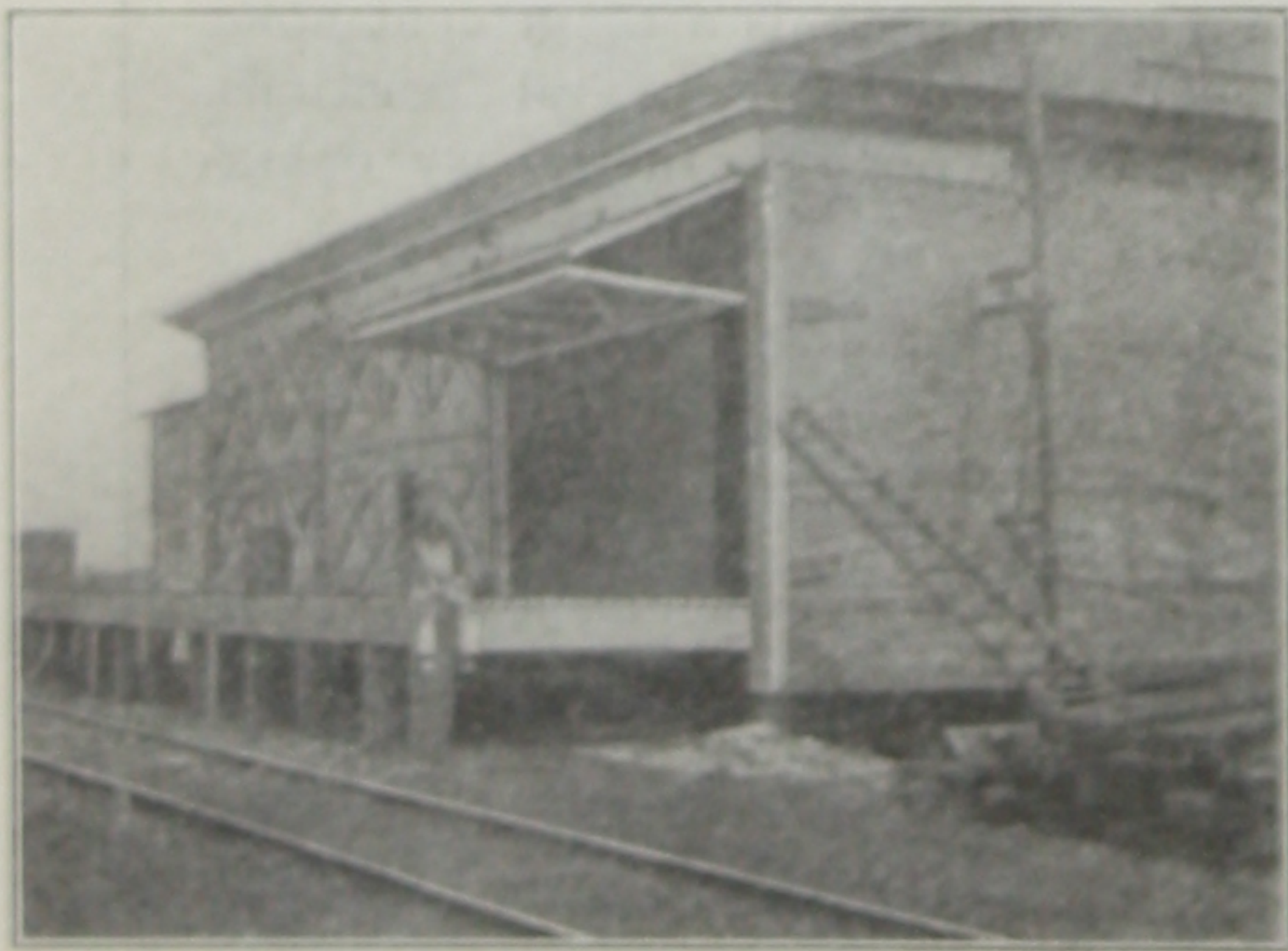
LARGE OPENINGS FOR TEAM ENTRANCES, ONE DOOR OPENED, THE OTHER CLOSED, SHOWING AVAILABILITY FOR WICKET DOOR.

For wagon entries, livery stables, breweries, and general use, a better construction could not be devised, for the reason that there are no side bars for "hubbing," there are no long over-head tracks, and no valuable room is taken up by the door having to slide open either to one side or above. The opening may be of practically any

width or height, and the action is perfection itself.

## CROSS Doors in Manufactories

The use of our door in factories and machine shops proves most economical, not alone considering the question of space, but decidedly in comparative installation and maintenance cost. Should walls or floors of the building settle, modification or adjustment of the tracks at the side would be all that would be required to assure renewal of perfect action.

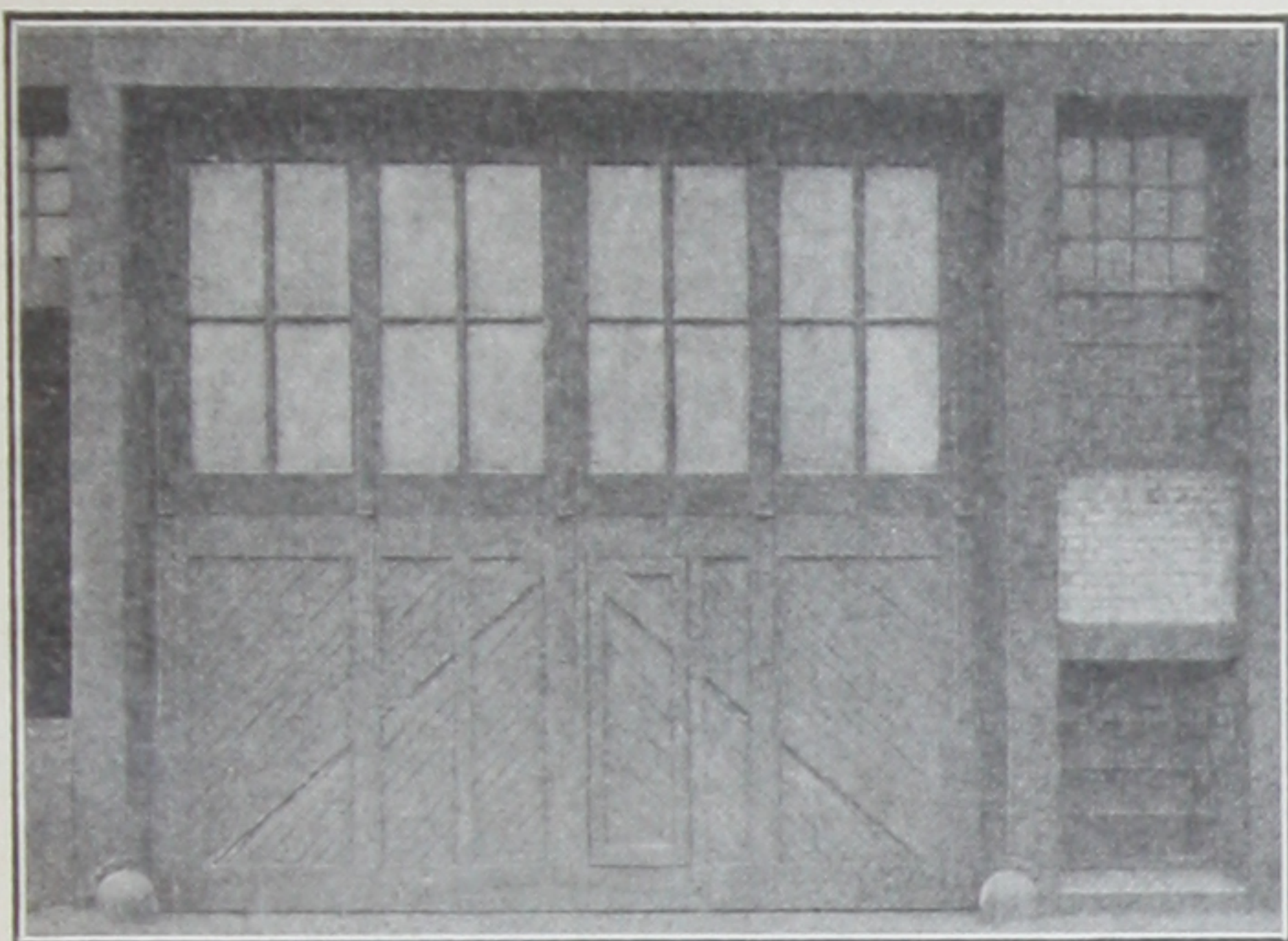


ISOLATED FREIGHT HOUSE OF PENNSYLVANIA R. R., ON THE JERSEY "MEADOWS."

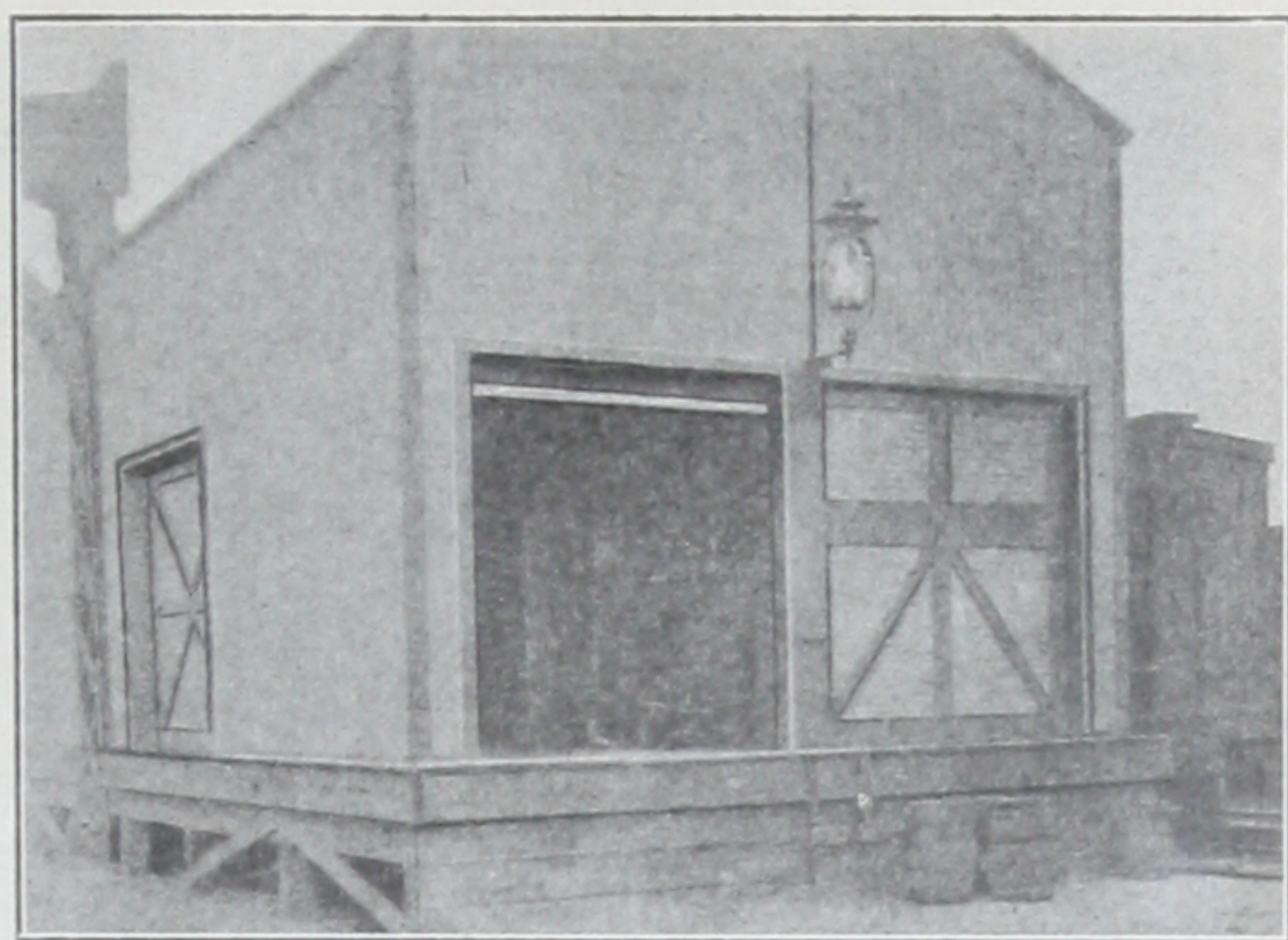


FIVE OF A 64-DOOR INSTALLATION, HIBBARD-SPENCER & BARTLETT, HARDWARE, CHICAGO.





SCULLY STEEL & IRON CO. WAREHOUSE DOOR,  
CHICAGO, 18 FEET WIDE, 16 FEET HIGH.



PENNSYLVANIA R. R. FREIGHT HOUSE, NEW  
YORK CITY (STREET FRONTAGE), SHOWING  
ENTIRE FRONT MADE AVAILABLE FOR  
TEAMING.

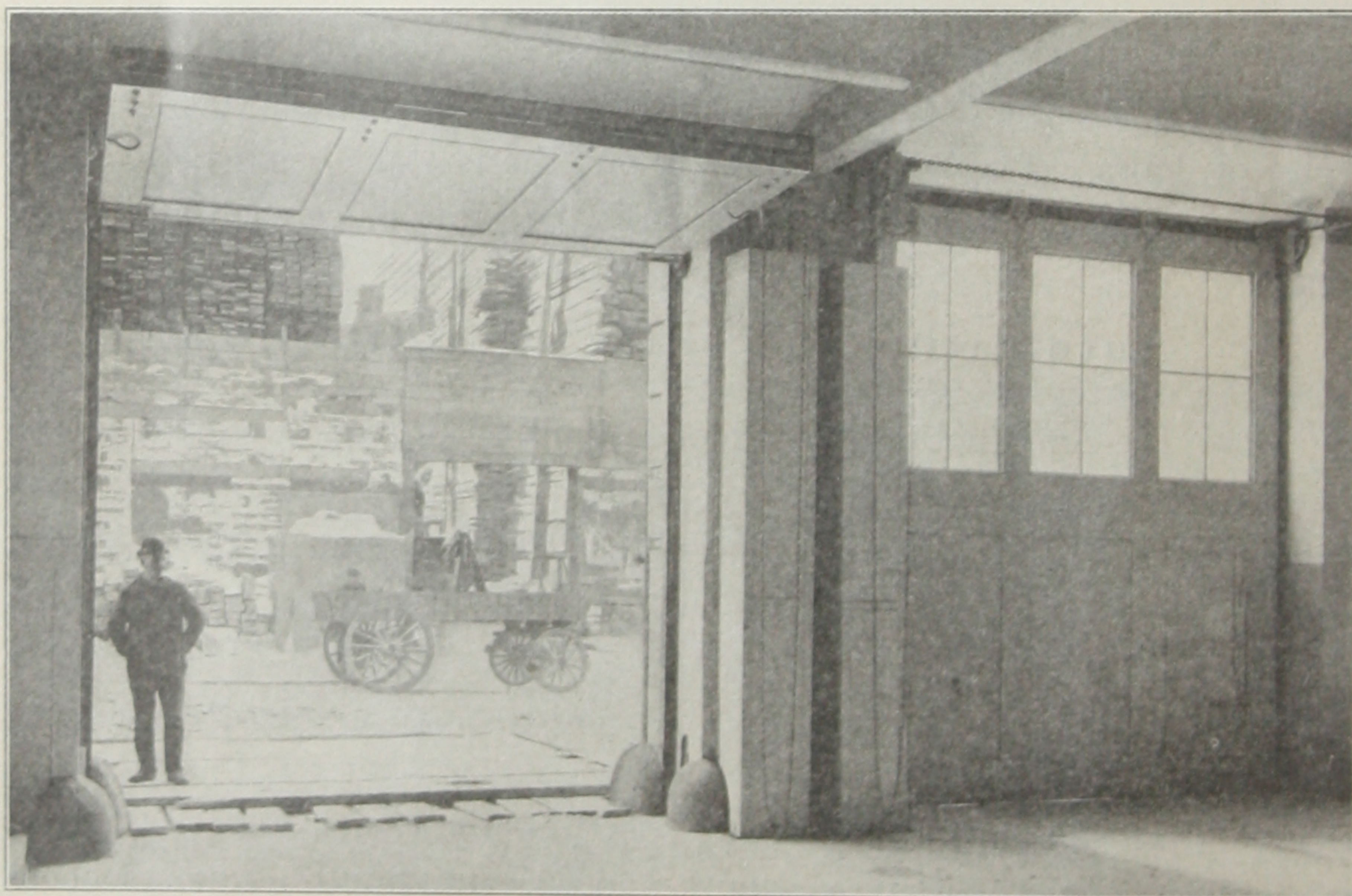
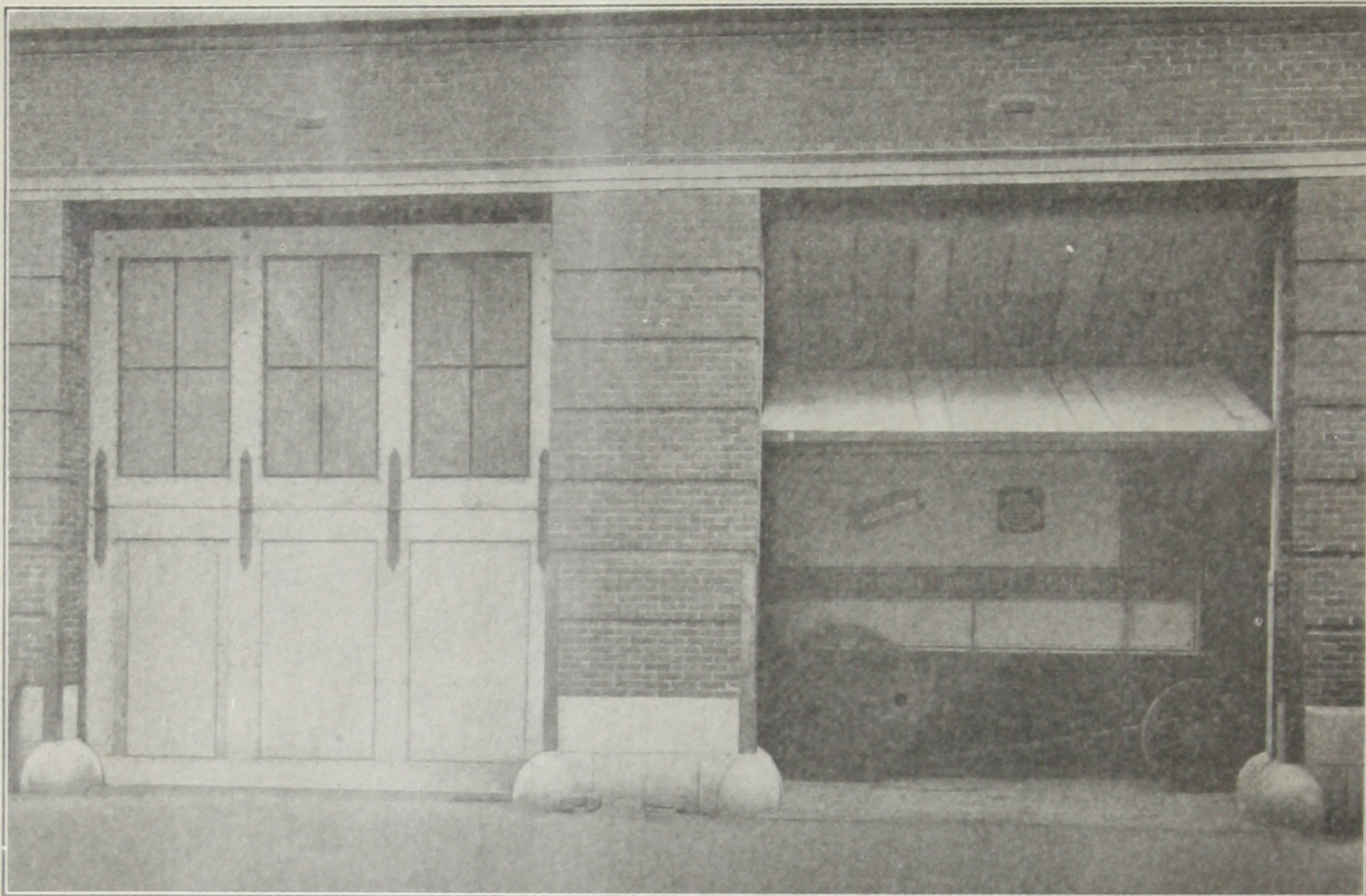
For car-barns, wherein overhead trolley cars are stored, an insulated contact rod may be attached to the lower section of the door in such manner that when the door is opened the section of trolley wire on the door fills in the gap which has to be left for the operation of the door between the inside and outside trolley wire connections. It is not necessary to leave a large opening in the top of the door, or carry the connections around the door, as is done in the case of installations of other styles of doors. There is no doubt about the contact being perfect and continuous, as the door opens to exactly the same place each and every time.

### Automatic and Fire Construction

For "fire-construction" the door is built according to regular *underwriter's specifications*, and hung by wrought hinges *from the top* by bolts fastened *through* the wall, a position much stronger than any other known for withstanding a fire. An auxiliary weight, suspended by means of a fusible link, makes this construction automatic. When the link is fused, the auxiliary weight is released and the counterbalance weight of the door is raised. In this manner the door is tightly closed, and self-acting locks are so affixed that the moment the door assumes such a position they snap into recesses, securely locking it and withstanding the force of back-draughts, escaping steam, gases, etc.

For stores, market-rooms or stands, where the front is desired to be opened clear, we can offer a better form of door than is possible in other styles of construction.



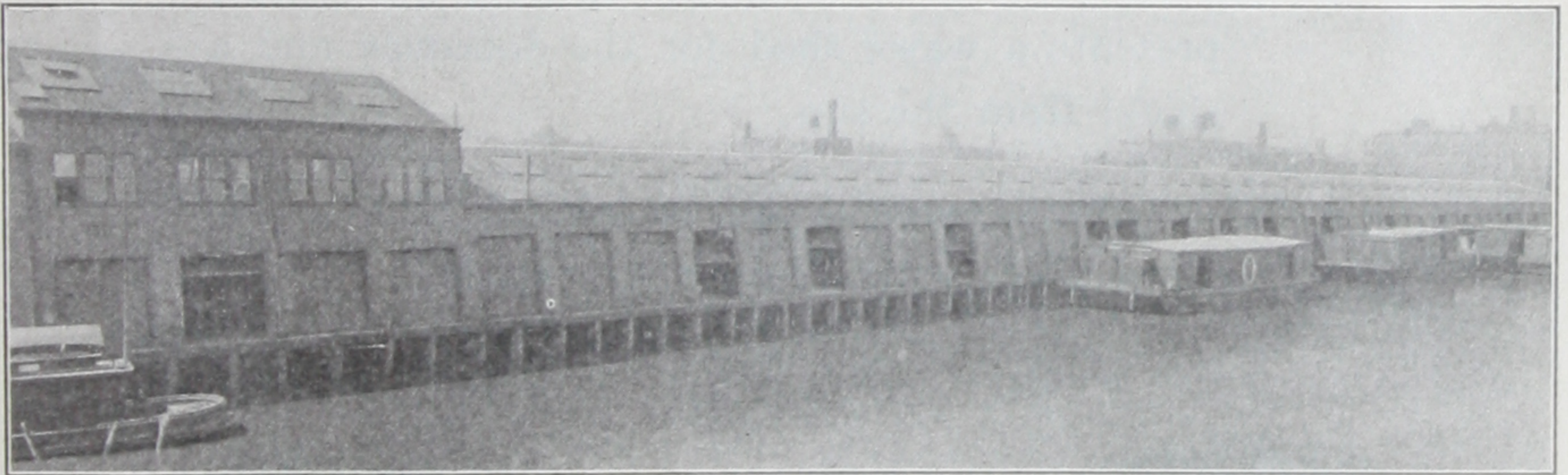


UPPER CUT SHOWS INSTALLATION MADE FOR NATIONAL BISCUIT COMPANY'S MODERN PLANT, FIFTEENTH STREET AND TENTH AVENUE, NEW YORK CITY, FROM OUTSIDE. LOWER CUT SAME INSTALLATION FROM INSIDE. NOTE THE SMALL AMOUNT OF OPERATING SPACE REQUIRED.



The accompanying list of prominent mercantile establishments wherein the CROSS Door has been installed is indicative of its adaptability for the purpose, and repeated specification in nearly every case proves that the door is eminently satisfactory.

United States Express Co., New York City.  
Marshall, Field & Co., Chicago.  
Sears, Roebuck & Co., Chicago.  
Montgomery, Ward & Co., Chicago.  
Hibbard, Spencer, Bartlett & Co., Chicago.  
Butler Bros., Chicago.  
Kelley, Maus & Co., Chicago.  
Western Electric Co., Chicago.  
Scully Steel & Iron Co., Chicago.  
Jos. T. Ryerson & Son, Chicago.  
Wm. J. Moxley & Co., Chicago.  
National Biscuit Co., New York.  
American Can Co., Cleveland, Ohio.  
J. I. Case Plow Works, Racine, Wis.  
Deere & Weber Co., Minneapolis, Minn.  
Belknap Brothers, Louisville, Ky.  
Butler Brothers, St. Louis, Mo.  
New York Edison Co., New York.



PENNSYLVANIA R. R. JERSEY CITY PIER, WHERE 76 CROSS DOORS ARE INSTALLED.

After a perusal of the foregoing, we feel positive that the conclusions we draw will be concurred in. The CROSS Horizontal Folding Door is unquestionably the leader. There is absolutely no appliance that can fill all of the conditions it successfully encounters; its low installation cost and long life place its value far above all other makes, and its ready operation commands esteem and admiration from all who know the subject well, while those who are not generally familiar with such details become rapidly cognizant and appreciative of them.



## Franklin Institute Award

On June 1, 1903, the Franklin Institute of the State of Pennsylvania, through its Committee on Science and Arts, awarded to Mr. Cross the John Scott Legacy Premium and Medal upon the following claims:

1. "Its long life compared with *any door*, it is at least the same.
2. It can be made of *any* desired *material*.
3. It differs from other doors in that it can be run up *out of the way*, where it is free from bumps and jabs.
4. Its *speed* and *ease* of *operation*.
5. This door when in its full opening (outward), presents a water shed for the door-way and a shield from the sun.
6. When closed, *material* can be packed *close* to the *doors*, thus giving a larger floor space."









